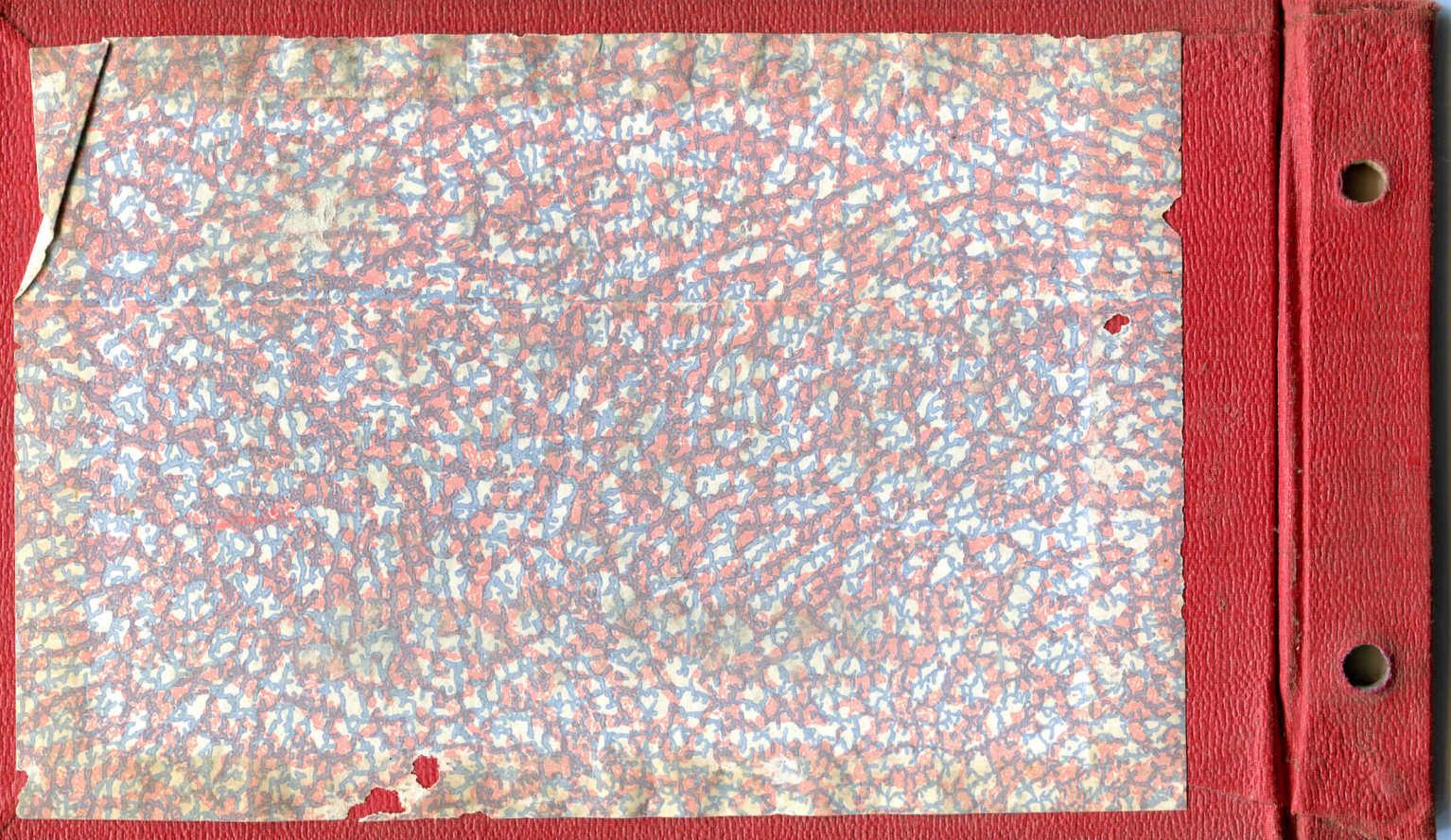


TASMANIA

Transport Commission (Railway Branch)



**Maintenance Code for
Permanent Way Staff**



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FOREWORD

This book has been prepared for the guidance of Permanent Way Staff, and as a reminder to them of what must be done to obtain a high standard of Track Maintenance.

The worst enemy of good track is water, and it is the duty of permanent way men to ensure that drains are kept clean and free running and that the formation and ballast is not allowed to become waterlogged.

A further enemy is movement, that is to say, track in which individual components move about under traffic.

If this occurs, the track will deteriorate quickly and will require excessive maintenance or premature renewal.

Early attention to rail fastenings (dogspikes, bolts, washers, keys, &c.) and to the blocks and bolts in switches, and crossings will assist in preventing initial movement and save much avoidable work later on.

When fastenings have been tightened, sleepers and timbers should be properly packed, so that track is uniformly and solidly supported on the ballast and does not move under traffic.

To sum up, *it is only by constant care and correction of faults* that you can get, and keep, your length in good condition, and so increase the life of the materials.

It is always well to remember that the old saying, "A stitch in time saves nine", is particularly true of all track work.

Finally, always observe the safety regulations both in the interests of the travelling public, and of yourself.

ISSUE OF CODE OF INSTRUCTIONS

1. Every Ganger of the Maintenance Section, shall hold a copy of this Code, and of the book of Rules and Regulations, and Appendix to the Book of Rules and Regulations, all of which must be read together.

In every Gang of Workmen, there shall be a Ganger, or Leading Hand, appointed by the Chief Civil Engineer.

CESSES

2. Where local conditions permit, cesses should be kept to a depth of six (6) inches below the bottom of the sleeper, and given a slight fall away from the sleeper ends.

They must not be built up without the consent of the District Engineer.

Ridges should not be allowed to form along the edges of the cess in such a way as to prevent water getting to the drain, or down the slopes.

Cuts or grips should be made from the cess through the grass verges, to allow water to drain down the slopes.

CULVERTS

3. Culverts must be inspected regularly by the Length Ganger, and kept clean.

The culverts, watercourses, and ditches between the Boundary Limits of the Railway Property on either side should be cleaned out during the January-March period, to ensure that there is no obstruction to the free flow of water in the wet season.

CUTTINGS

4. Regular examinations of rock cuttings should be made, particularly after severe frost, to observe if faces have loosened to such an extent that there is a possibility of any rock falling in sufficient quantities to endanger traffic.

Report any risk to the Inspector, and protect traffic, if necessary, in accordance with Rule 282.

CLEARANCES

5. Clearances are one of the most important factors in the work of a Railway man. If not carefully watched, and immediately remedied, serious accidents and great damage will be the result.

All clearances are measured from the centre of line, and rail level.

The most important clearances to be carefully watched by the permanent way man are as follows:—

Passenger Platform is	=	5' centre of line to face of coping
Passenger Platform is	=	2' 6" rail level to top of coping
Goods Platform is	=	5' centre of line to face of coping
Goods Platform is	=	2' 8" rail level to top of coping
Coal Stage is	=	5' 5" centre of line to face of closest part
Coal Stage is	=	4' 6" rail level to floor of stage
Tank Stands	}	All 7' from centre of line to the closest part of the object
Water Columns		
Fences, Buildings, &c.		

All stacked loose materials such as rails, sleepers, fencing materials, and firewood } 8' from the centre of line to the front of stack

All plant of any kind must be placed quite clear of the line at least 8 feet from the centre of the line.

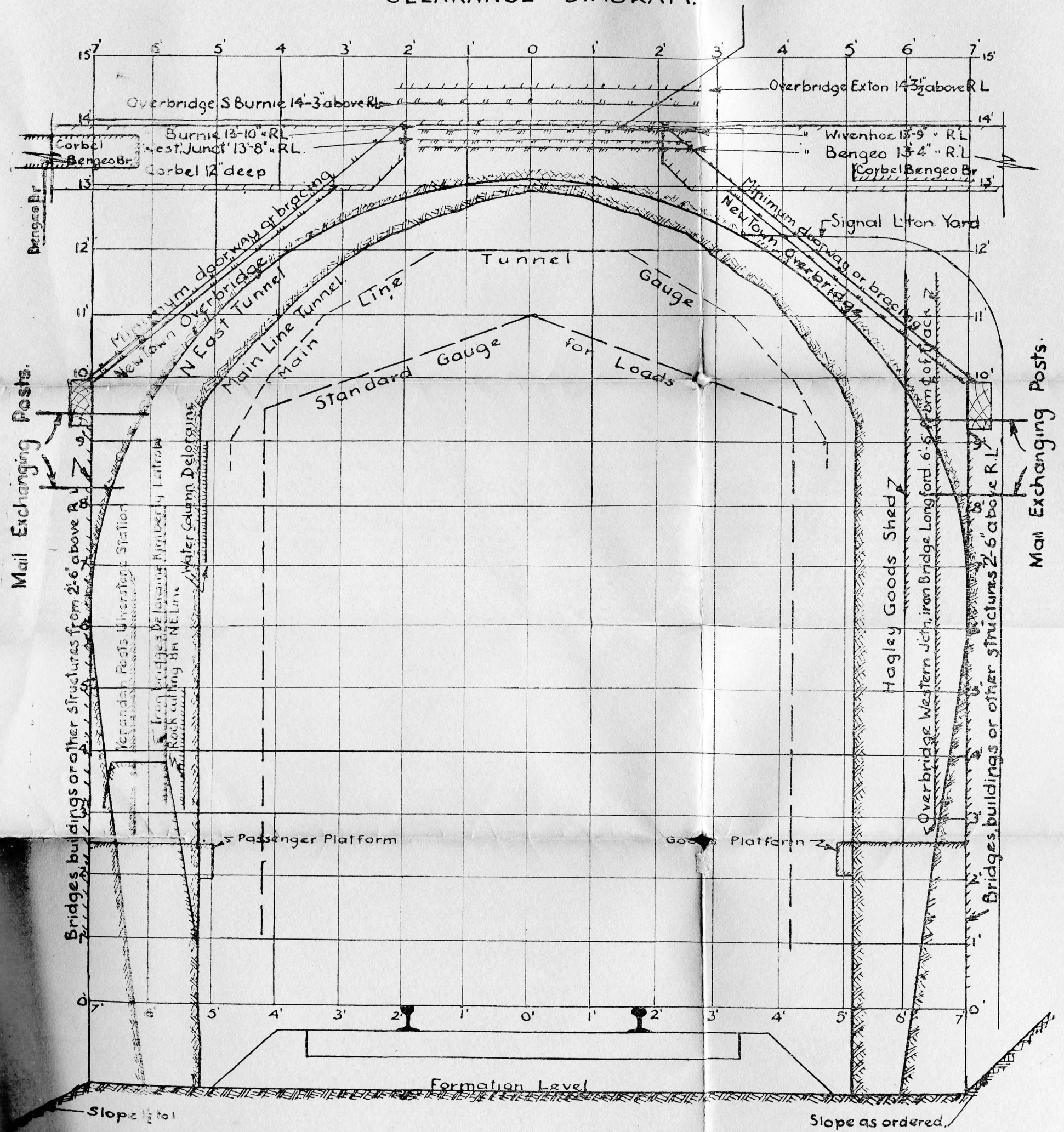
The minimum clearance from centre to centre of double lines in any circumstances is 12 feet 6 inches.

Door stops, and guide rails for doors of sheds into which engines run must not be above rail level.

Minimum flange clearance for any *steel* check rail is $1\frac{3}{4}$ inches and 2 inches for any wooden check such as level crossings and timbers on road crossings.

Slewing, lifting or alteration to the authorised superelevation which will reduce clearances must not be carried out without the authority of the District Engineer.

CLEARANCE DIAGRAM.



All material, or plant of any kind including firewood and timber, must be placed quite clear of the line at least 6'-0" distant from the rail and no stacks may be allowed to overhang towards the line.

LEVEL CROSSINGS

6. Level crossings (private, occupation, accommodation, or public) must be maintained in a reasonable condition, and particularly the rail, timbers, and adjacent paving must be kept at about the same level.

Any repairs or renewals to level crossing timber, gates or gate posts to private crossing installed subsequent to where the line was originally constructed must be referred to the Inspector for account number to charge costs to.

CANT ON CURVES

7. Uniformity of cant on any curve is more important than the exact amount.

The run out of the cant on any curve may be flatter, but must not be quicker than 1 inch in 40 feet, unless the District Engineer has authorised a quicker run out to meet exceptional conditions.

Under no circumstances may a run out be quicker than 1 inch in 30 feet.

Cant on curves is to be applied by raising the outer rail; the inner rail being maintained at the grade line.

The cant on curves will be in accordance with the table set out herewith.

TABLE OF CANT, SLACK AND CURVE SPEED BOARDS.

Radius in Chains	Offset on 40' string	SLACK		Speed Board	Cant for maximum speed for passenger bogie other than D.P. cars						
		Max.	Min.		SPEED						
					15	20	25	30	35	40	45
	inches	inches	inches		inches	inches	inches	inches	inches	inches	inches
5	7 $\frac{1}{4}$	3 $\frac{3}{4}$	1 $\frac{1}{2}$	20	1 $\frac{1}{4}$	2 $\frac{1}{4}$	—	—	—	—	—
6	6	2 $\frac{1}{2}$	1 $\frac{1}{4}$	20	1	2 $\frac{1}{4}$	—	—	—	—	—
7	5 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	25	3 $\frac{3}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	—	—	—	—
8-9	4 $\frac{1}{2}$ -4	1 $\frac{1}{2}$	1 $\frac{1}{4}$	25	3 $\frac{3}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	—	—	—	—
10	3 $\frac{5}{8}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	30	2 $\frac{1}{2}$	1	2	2 $\frac{1}{4}$	—	—	—
11	3 $\frac{1}{4}$	—	—	30	1 $\frac{1}{2}$	1	1 $\frac{1}{2}$	2 $\frac{1}{4}$	—	—	—
12	3	—	—	30	1 $\frac{1}{2}$	1	1 $\frac{1}{2}$	2 $\frac{1}{4}$	—	—	—
13	2 $\frac{3}{4}$	—	—	30	1 $\frac{1}{2}$	1	1 $\frac{1}{2}$	2	—	—	—
14	2 $\frac{5}{8}$	—	—	30	1 $\frac{1}{2}$	1	1 $\frac{1}{2}$	2	—	—	—
15	2 $\frac{3}{8}$	—	—	35	1 $\frac{1}{4}$	3 $\frac{3}{4}$	1	1 $\frac{3}{4}$	2	—	—
16	2 $\frac{1}{4}$	—	—	35	1 $\frac{1}{4}$	3 $\frac{3}{4}$	1	1 $\frac{3}{4}$	2	—	—
17	2 $\frac{1}{8}$	—	—	35	1 $\frac{1}{4}$	3 $\frac{3}{4}$	1	1 $\frac{3}{4}$	2	—	—
18	2	—	—	35	1 $\frac{1}{4}$	3 $\frac{3}{4}$	1	1 $\frac{1}{2}$	2	—	—
19	1 $\frac{7}{8}$	—	—	35	1 $\frac{1}{4}$	3 $\frac{3}{4}$	1	1 $\frac{1}{2}$	2	—	—
20	1 $\frac{7}{8}$	—	—	35	1 $\frac{1}{4}$	3 $\frac{3}{4}$	1	1 $\frac{1}{2}$	2	—	—
21-25	1 $\frac{3}{4}$ -1 $\frac{1}{2}$	—	—	40	1 $\frac{1}{4}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	—
26-30	1 $\frac{3}{8}$ -1 $\frac{1}{4}$	—	—	40	1 $\frac{1}{4}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	—
31-35	1 $\frac{1}{8}$ -1	—	—		0	1 $\frac{1}{4}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{3}{4}$
36-40	1 - 7 $\frac{7}{8}$	—	—		0	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$
41-50	7 $\frac{7}{8}$ -3 $\frac{3}{4}$	—	—	Not to be erected	0	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	1	1 $\frac{1}{4}$
51-70	3 $\frac{3}{4}$ -1 $\frac{1}{2}$	—	—		0	+	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	1
71-80	1 $\frac{1}{2}$ -3 $\frac{3}{8}$	—	—		0	0	0	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$
Over 80	—	—	—		0	0	0	0	0	0	0

Cant must be run out at the rate of 1" in 40' and maximum allowable variation will be $\frac{1}{4}$ " up to $\frac{1}{2}$ " down on the above figures. The maximum allowable variation in cross level will be $\frac{1}{2}$ " in any 10' length. The slack gauge specified above also refers to points and crossings which must not be gauged narrower than 3' 6 $\frac{1}{2}$ " on the turnout road. Cant is not necessary in station yards, but where the main running track is on a sharp curve use one half ($\frac{1}{2}$) the new regulation cant between Home Signals.

DEFECTIVE OR UNSERVICEABLE MATERIAL

8. Gangers must see that all broken rails, sleepers, fastenings, or other defective or unserviceable material in the line are promptly removed and replaced by sound material.

JUNCTION FISH PLATES

9. Junction Fish Plates are utilised at the joint between two rails of different section, such as 82 lb. to 63 lb.

They are ordered in pairs and need special attention when examining the track. They are made up of right and left hand pairs.

To determine the hand required, look from the heavier to the lighter rail, and that on your right is a right hand pair, and that on your left is a left hand pair. If the rails are both of the same weight but different sections, such as 60 lb. Australian Standard "A" and 60 lb. N.S.W., look from the latest section, the 60 lb. A.S.A. to the oldest section, the 60 lb. N.S.W., and that on your right is the right hand pair and that on your left is the left hand pair.

FISH PLATES

10. All fish plates, bolts, and rail ends must be oiled or greased before fixing in the track.

Graphite grease must be kept on hand for greasing the fishing faces of fishplates.

INSULATED JOINTS FISH PLATES

11. All insulated joints must be kept clean and free from scale, dirt, grease and oil.

The joint must be maintained so that expansion or creep of the rails does not crush the insulation between them.

Bolts must be kept tight and insulation must be replaced when worn and before the ends of rails can become crippled.

GANGERS TO KEEP FENCES IN REPAIR

12. Gangers are advised that they are responsible for seeing that fences on their Section are in good order. Gangers must effect temporary repairs when fences are down or in a dangerous condition.

Inspector to be notified immediately, so that Fencers can be instructed to make permanent repairs.

Repairers when running the length, if they see any defects that allow stock to trespass on the line, must carry out temporary repairs, also, and report the matter to the Ganger.

FIRES AT BRIDGES

13. If any portion of a Bridge catches on fire, so that the structure is endangered, or if a fire takes place near the Railway so as to endanger the safety of the track, the lines concerned must be blocked at once (in accordance with rule 281 of the Book of Rules and Regulations).

The local staff must do their best to extinguish the fire, and should summon help as necessary. The Inspector and District Engineer must be advised immediately.

When the fire is under control, the Ganger must make a thorough inspection of the track, and if the track over, or under

a structure has been blocked, it must not be re-opened to traffic, until the structure has been passed as safe by a responsible supervisor, if necessary, the Bridge Inspector being summoned. Should the Ganger be satisfied that any damage caused is so light that it is quite safe to do so, he may re-open the line to traffic.

Fire danger observed by Enginemen is communicated by whistle to Permanent Way Staff as follows:—

ONE SHORT—ONE LONG—ONE SHORT
Distinct Whistle.

FIRES—PREVENTION AND BURNING OFF

14. The Railway Department is required to abide by the Rules of the Rural Fires Act, 1950, from the 1st of December, to the 31st March.

Each Ganger will be advised of the date when public notice has been given in regard to burning off, and, after the expiration of seven days' notice, it will be necessary for the Ganger to advise the District Fire Warden (through the Stationmaster nominated) his intention to commence burning off for the ensuing twenty-eight days.

In the case where Railway reserves pass through a fire protected area, the Forestry Officer will issue a special permit before burning off can commence.

Where the Permanent Way passes through a non Rural Fire District it is in order to commence burning off after seven days public notice has been given, of which the Ganger will be advised.

When a "Fire Danger Day" is declared, all fires must be extinguished, and none lit until the Fire Warden gives permission to resume burning off. As much burning off as possible is to be done prior to the 1st of December.

Gangers are instructed that all fire-fighting equipment must be carried on motors from the 1st December to 31st March.

PROTECTION OF FENCES AND OTHER STRUCTURES FROM FIRE

15. During the Summer months, station buildings, platforms, bridges, culverts, gateposts, telegraph poles, speed boards, and mileage pegs must be protected from fire by chipping grass around same for a distance of two feet.

All concerned are to give this careful attention.

PROTECTION OF CROPS AND PROPERTIES FROM FIRE

16. Permanent Way Gangers are instructed, that before the ripening of crops, and as far as possible, not later than the end of November each year, a fire break, at least three feet wide, must be chipped clean of all grass and rubbish along railway fences where crops adjoin the railway, or are separated from the railway by grass lands, or unformed roads that are not clean of inflammable material.

This also is to apply to properties in towns and elsewhere that are in danger of fires spreading from the Railway reserve.

In cases of fires occurring and damaging property adjoining the Railway, the Ganger in charge of the length is to proceed at once to the spot to find the cause of the fire, and immediately thereafter telegraph the District Engineer of the district concerned, when the Inspector will be instructed to proceed to the scene of the fire to further investigate.

OPERATION OF GANG MOTORS, TROLLIES, AND TRICYCLES—PERMITS

17. Only employees who are qualified and hold permits have authority to operate Gang Motors, Trollies, and/or Tricycles.

These employees must carry out the instructions which have been issued for the operation of these vehicles.

(See paragraph 19 for instructions in regard to use of these vehicles.)

USE OF TROLLIES, GANG MOTORS AND TRICYCLES

18. All members of the Staff are notified that unless instructed to the contrary, by a permanent way inspector, or more superior officer, gang cars, inspection motors, trolleys or tricycles, must not, under any circumstances, be used for other than strictly Departmental purposes.

These vehicles are not to be used for the conveyance of other than Departmental tools and materials, officers and employees, food, clothing, &c., nor for the conveyance

of dogs, other animals, firearms, rabbit traps, or other such articles unless specifically authorised by the Chief Civil Engineer in writing.

Any breach of this instruction, or any instance when it is found necessary to act contrary to this instruction, such as in case of accident, or sickness, must be fully reported to the Chief Civil Engineer in writing.

GANG MOTORS—USE AND MAINTENANCE

USE OF GANG MOTORS, TROLLIES AND TRICYCLES

19. Employees in charge of gang motors, trolleys and tricycles must strictly adhere to the following rules:

1. On no account must they be on the road within 10 minutes of schedule time of trains.
2. Employees in charge of gang motors, tricycles, &c., are warned that sometimes it becomes necessary to run un-notified trains and also for goods trains to run ahead of time. The invariable practice must therefore be adopted of using telephone en-route to definitely ascertain the position of all trains on both the section ahead, and in the rear. In moving a gang motor, trolley or tricycles on section between point of departure and nearest telephone, extra precaution must be observed. Gangers will be held responsible for any accident that may occur through the dis-regarding of the instructions.
3. Every care must be taken that watches are in good order, and checked as often as possible with Railway times.
4. Gangers and drivers of gang motors and tricycles are instructed that when approaching a road crossing the gang motor or tricycle is to be stopped before proceeding over the crossing.

MAINTENANCE OF GANG MOTORS

6. All working parts must be kept clean, well oiled, and greased in accordance with the instructions set out below:—

OILING WEEKLY.

Valve guides
Brake shaft linkage
Pedestal shaft
Application lever
Shifting lever
Chain
Cam followers
Oil pump drive

GREASING WEEKLY.

Axle boxes (old type)
Free wheel (R.H.F.)
Pedestal boxes
Crank handle bracket
Gear shifting ring

MONTHLY

Engine Oil change

7. Engine oil must be checked and kept topped up to the correct level at all times.
8. The general up-keep of the motor to be clean and tidy.
9. Care should be taken not to overload the motor by hauling loads which are too heavy.

The amount of load should be worked out in relation to the grade. Maximum load 20 sleepers per flat top trolley.

10. At no time should the motor be started in high gear from a standing start.
11. Slipping between disc wheel and friction wheel must be reduced to a minimum. When taking off, a low gear must be selected firstly, and the friction wheel should then be pulled on to the disc. The take-off should be assisted by men pushing the motor until the wheels are rolling, especially when loaded.
12. The friction wheel should never be pulled on to the disc wheel harder than necessary (to prevent slipping) as too much pressure damages the friction wheel, strains the disc wheel bearing and causes the motor to run hot.

It may not be possible to get up a grade with a heavy load in top gear, so it is then necessary to stay in a lower gear. It is frequently necessary to use two low gears on an up-grade before changing to high gear. Do not let the engine "labour" in high gear, change down to a lower gear.

Those responsible for the operation and care of gang motors are advised that where the motors have been in use for many years they require more care and attention than ever before to obtain satisfactory service from them.

13. Cases of breakdown must be reported immediately, and details of same given as far as possible.
14. Petrol and oil supplies must be kept under lock and key, and Stores Order for further supplies forwarded in

sufficient time to enable same to be received before the previous supply is exhausted.

15. Motor mileage to be recorded in time-book at the end of each period, and approximate petrol consumption stated.
16. Maximum speed to be definitely fixed, at 25 miles per hour.
17. On no account, unless in cases of extreme urgency, must gang motors be used at night. Should cases of emergency arise, necessitating night running, the motor must be equipped with lights.
18. Empty petrol and oil drums must be consigned to Way and Works Store, Hobart or Launceston.
19. There must be at least two men with motor where it is being operated on the track.

GAUGE OF TRACK

20. Track must be kept true to gauge on straights, and in good line. Both rails on straights must be maintained at the same level. Slack will be given at the rate of $\frac{1}{8}$ inch in 10 feet, in accordance with the table herewith.

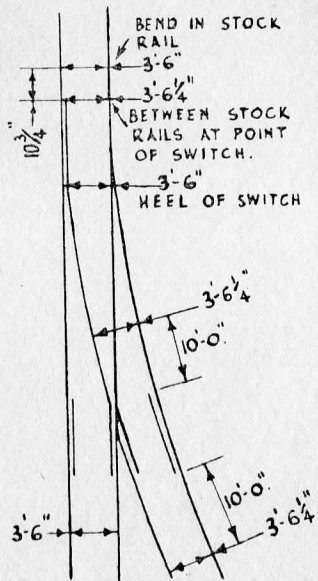
Where there is no transition to the curve, the gauge will begin to widen on the straight track so that half the standard slack is obtained at the tangent point.

The remainder of the slack will be given on the curved track.

Where rails are worn or spread to more than $\frac{1}{4}$ inch over the regulation slack the track must be regauged.

The gauge is measured between the running edges of the rails at a point $\frac{5}{8}$ inch below rail top surface.

Where there are points and crossings on straight roads, the gauge will be in accordance with the following rules and with the diagram in the margin:—



The gauge at the bend in the stock rail before reaching the point of the blade is to be 3 ft. 6 ins., the distance between the stock rails at the point of blade 3 ft. 6 $\frac{1}{4}$ ins., the gauge distance between closed blades and the opposite stock rail 3 ft. 6 ins.

For straight road the gauge is to be 3 ft. 6 ins. throughout.

Except where curved switches are used, the gauge on the turnout road is

to continue at 3 feet 6 inches to the heel of the blade, widening gradually to 3 ft. 6 1/4 ins. at a distance of 10 ft. in front of the check rail and continued through the check rail to a point 10 ft. beyond the back of the check rail.

Where there are points and crossings on curves the slack on the main line curve shall be maintained except that the gauge shall gradually close in from the bend in the stock rail at the point of the blade to correct gauge at the heel of the blade.

PERMANENT WAY INSPECTION

Inspection of the Permanent Way is to be carried out by the following personnel as defined under each heading:

21. GANGERS AND REPAIRERS (*Daily Inspection*)—

(1) Under rule 291 (a-h) it is the responsibility of the Ganger to see that the whole of the track for which he is responsible is inspected every morning, as soon as possible after the stipulated time for commencement of duty, or earlier, if he thinks necessary. This inspection is to be made by the Ganger himself or may be delegated in part, or whole, to a member of the gang whom the Ganger considers is sufficiently responsible and experienced to do so.

(2) The employee doing the track inspection must carry sufficient tools and fastenings, in order that he can make temporary, if not permanent, repairs to any portion of the track which he finds defective.

(3) He must be equipped as specified in Rule 290 in order that he can protect the

line in accordance with Rule 281 where he finds any defect which he is unable to immediately rectify and which renders the track unsafe for the passage of trains.

(4) He must satisfy himself that untended sidings are securely locked, that all crossing gates are secured, and that the flangeways at line crossings are not fouled, and there is no stock straying in the Railway Reserve.

(5) He must know the Rules and Regulations and instructions contained in the Appendix when each affect his work. Each rule or instruction is made in order to guard against some *known cause* of accident, and it is only by strict observance of these rules and instructions and honesty of purpose in his daily inspection that he can be classed as a good servant of the Department.

Non observance of the Rules and Regulations, Instructions or direction from his Senior Officers will render a Ganger liable to disciplinary action.

PERMANENT WAY INSPECTION

22. GANGERS (*Monthly Inspection*)—

(1) Each Ganger must make on foot at the end of *every month*, an inspection of his length, when everything including earthworks, culverts, and bridges and permanent way must be examined, and a report of such inspection must be forwarded to his Inspector. The Ganger should mark, for attention, all track defects, including rail creep, and enumerate these in his report.

(2) At the middle of each month, a close inspection of all curves on foot, to observe

any indications of track spreading or the rail "working" where spikes have been pushed outwards. Owing to the tendency of new types of engines to spread the tracks, all sleepers must be replaced before they are too weak to firmly hold spikes.

(3) He is to mark for attention, all cases of weak formation, tight or excess gauge, excess or irregular cant, loose joints, defective sleepers and dogspikes, "pinched" or irregular curves, inadequate drainage and anything detrimental to the safe running of trains.

SATURDAY AND SUNDAY LENGTH INSPECTION

23. As a general rule, and with very few exceptions on the major Railway systems, inspections of lengths by the Way and Works Section is not carried out on Sundays unless serious wet weather or abnormal conditions exist.

In accordance with this practice, Gangers will arrange for length running before Saturday and Sunday trains, only if the following circumstances arise:—

- (a) Where heavy rain occurs on Saturday or Sunday morning before the passage of a train over the length.
- (b) Where rain falls throughout the week, and flood conditions exist; even though rain has not fallen on Saturday or Sunday.

- (c) Where heavy rain occurs on the length after it has been inspected on a Friday.
- (d) Where abnormal circumstances, such as a slip which has recently given trouble, exists on the section.
- (e) Where advice is received from the Chief Civil Engineer, District Engineer, Permanent Way Inspector, or Control Office, that special circumstances require the length to be run.

In all cases where it is found necessary to run the length on a Saturday or Sunday, the reason is to be briefly stated on the time sheet, and certified by the Ganger and Inspector.

INVENTORY SYSTEM

25. All plant, tools, and camp equipment in the Way and Works Section is ordered, recorded, and cleared according to the Inventory System.

Instructions governing the operation of the System are issued by circulars.

Gangers and other employees in the Way and Works Section are held responsible for the plant, tools, and camp equipment held by them.

Authority for writing off any lost or stolen plant, tools, or camp equipment is issued from the office of the Chief Civil Engineer, after thorough investigation is made in each case.

LIFTING OF PERMANENT WAY

26. In lifting the track make a runout of 30 feet, for each inch of lift, when the scheduled speed of trains is 30 M.P.H. or over, and 20 ft., for each inch of lift when the scheduled speed is less than 30 M.P.H.

Runout should be made in such a manner as not to occasion any sudden change of gradient.

The maximum lift of one operation on track under traffic must not exceed three inches (3").

When both rails have to be lifted they must be raised equally, and at the same time. If the lifting is on a double line, the operations can always be carried out so that trains will ascend and not descend the runout.

On single lines, where trains run in opposite directions, runouts will be made so that the highest speed train will ascend and not descent runout, great care being taken where there is a curve, to preserve the super-elevation of the outer rail.

LINE BLOCKS

27. When serious damage occurs to the Railway, or any accident happens which caused a block on the line, Gangers must wire full particulars to the Inspector, and District Engineer, stating the probable duration of the block, and what assistance is required, they must carry out safety regulations in accordance with Rule 281 of the book of Rules and Regulations.

Accidents to employees must be reported immediately, form 598 completed, and forwarded to the Inspector by the first train, within twenty-four (24) hours of the accident.

MATERIAL SUPPLY

28. Gangers are instructed that the quantities of material to be held by ordinary gangs are as follows:—

- (a) 6 rails of weight used in Main Line.
- (b) 2 rails of weight used in Sidings on length.
- (c) 1 cwt. of fishbolts of the weight used in the Main Line.
- (d) $\frac{1}{2}$ cwt. of fishbolts of the weight used in Sidings.
- (e) 1 set of junction plates of weight used in Main Line and sidings.
- (f) 1 cwt. of dogspikes.
- (g) 6 pairs of fishplates of weight used in Main Line.

(h) 2 pairs of fishplates of weight used in sidings.

(i) 100 sleepers 9" x 5" new.

In addition to the above the District Engineer and Inspector will decide to stock any other spare parts as the requirements of the particular lengths demand. The keeping of surplus material at any place where it may not be required for years should be avoided. All material should be neatly and conveniently stacked so that it can be picked up quickly at any time.

They must apply to the Inspector for supplies in time to prevent their stocks running short.

TRANSFER OF MATERIAL

29. Only in cases of extreme emergency will material be transferred from Gang to Gang, or Section or District without the prior authority of the Inspector.

When material is being transferred from one length to another without the prior authority of the Inspector, it must be tallied carefully and a duplicate list made out, one copy to be sent to the Inspector

and the other to the Ganger to whom material is consigned.

Lists to be forwarded at same time as material.

The Ganger receiving should tally material where it is being unloaded, and, if it does not agree with the list, must advise his Inspector immediately. Inspector to forward transfer docket when he receives list from Ganger.

MAINTENANCE OF POINTS AND CROSSINGS

30. Gangers must give special attention to all points and crossings under their charge; all bolts must be kept screwed up; they must see that blade stops are not missing or broken; spreader bars kept clear of ballast; and at un-attended sidings, chairs black leaded and rubbish not allowed to accumulate about turnouts.

OVERTIME—WAY AND WORKS SECTION

31. It is noted that some Gangers in the Way and Works Section when called on to work overtime in connection with derailments, &c., are not taking a full (8) hours off duty after completing work.

This leads to continuous shift, with consequent payment of double time.

Gangers are advised that after completion of work involving overtime they must take a full (8) hours off duty prior to recommencing work, unless other circumstances governing the interests of safe working make this impracticable.

All concerned are to take steps to see that this instruction is carried out.

Timesheets:

One of the most important duties of a Ganger, is the correct compilation of Timesheets, and no efforts should be spared to see that the correct number of hours are entered against the appropriate account number. Particular care is to be taken in this regard to booking time against Production Order numbers.

Strict attention should also be given to correctly enter hours in the appropriate columns for Annual Leave, Travelling Time, Camping allowances, &c.

PREVENTION OF ACCIDENTS AT LEVEL CROSSINGS

32. The exercise of strict supervision over the visibility at level crossings, is one of the vital factors in the prevention of accidents.

Gangers are instructed that it is their duty to make sure that the conditions of visibility at all level crossings in their sections are such as to leave no cause for complaint.

Where measures can be taken by the Ganger to remove any obstructions on Railway property which will improve visibility at crossings, this is to be done.

Should obstructions exist on private property, which limit visibility, the District Engineer is to be advised in order that appropriate action can be taken.

POINT LOCKS

33. Instances have occurred from time to time when point locks have been discovered unlocked, damaged or lying on the ballast.

When inspecting the lengths, those concerned must pay particular attention to the locks, and in all cases where they are found unlocked the matter must be reported immediately to the Inspector.

RAIL EXPANSION

34. Gangers are especially instructed to see that rails have proper expansion spacing, particularly on curves. Whilst fish-bolts and fish plates must be kept tight at all times; they must not be so tight to prevent rail expansion.

On very hot days additional inspection must be given to prevent the possibility of the track buckling.

Expansion spaces at joints are to be as follows:—

ON HOT DAY

45' rails	40' rails	36' rails	30' rails	24' rails
"	"	"	"	"
1/16	1/16	1/16	1/16	1/16

ON A MEDIUM DAY

1/4	1/4	3/16	3/16	1/8
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ON A COLD DAY

3/8	3/8	5/16	5/16	1/4
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RAIL CURVING

35. All rails to be used in curving must have the proper curvature given them in accordance with table herewith, but under no circumstances must hammers be used for the curving of steel rails, the proper curvature being given by the use of Jim Crows.

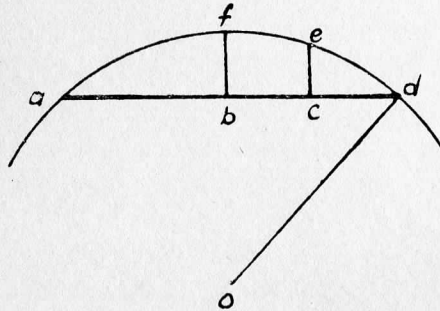


Table of offsets at Centre of String (b.f.)								Table of offsets at quarter points of String (e.c.).								
Radius in Chains	Length of String (feet)							Radius in Chains	Length of String (feet).							Radius in Chains
	20	24	30	34	36	40	45		20	24	30	34	36	40	45	
4	2¼	3¼	5⅛	6⅞	7⅝	9⅛	11½	4	1⅞	2⅞	3⅞	4⅞	5⅞	6⅞	8⅞	4
4½	2	2⅝	4⅞	5⅞	6½	8⅞	10½	4½	1½	2⅞	3⅞	4⅞	4⅞	6	7⅞	4½
5	1⅞	2⅝	4⅞	5¼	5⅞	7¼	9⅞	5	1⅞	2	3	3⅞	4⅞	5⅞	6⅞	5
5½	1⅞	2⅞	3¾	4¾	5⅞	6⅞	8⅞	5½	1¼	1⅞	2⅞	3⅞	4⅞	5	6⅞	5½
6	1½	2⅞	3⅞	4⅞	4⅞	6	7⅞	6	1⅞	1⅞	2⅞	3⅞	3⅞	4½	5⅞	6
7	1⅞	1⅞	2⅞	3¾	4¼	5⅞	6⅞	7	1	1⅞	2⅞	2⅞	3⅞	3⅞	4⅞	7
8	1⅞	1⅞	2⅞	3⅞	3⅞	4⅞	5¾	8	1⅞	1¼	1⅞	2½	2¾	3⅞	4⅞	8
9	1	1⅞	2¼	2⅞	3¼	4⅞	5⅞	9	¾	1⅞	1⅞	2⅞	2⅞	3	3⅞	9
10	1⅞	1⅞	2⅞	2⅞	2⅞	3⅞	4⅞	10	1⅞	1	1½	2	2⅞	2¾	3½	10
11	1⅞	1⅞	1⅞	2⅞	2⅞	3⅞	4⅞	11	⅝	⅞	1⅞	1⅞	2	2½	3⅞	11
12	¾	1⅞	1⅞	2⅞	2⅞	3	3⅞	12	⅞	¾	1¼	1⅞	1⅞	2¼	2⅞	12
13	⅞	1	1⅞	2	2¼	2⅞	3⅞	13	½	¾	1⅞	1½	1⅞	2⅞	2⅞	13
14	⅞	1⅞	1⅞	1⅞	2⅞	2⅞	3⅞	14	½	1⅞	1⅞	1⅞	1⅞	2	2½	14
15	⅞	⅞	1⅞	1¾	1⅞	2⅞	3⅞	15	½	1⅞	1	1⅞	1⅞	1⅞	2¼	15
20	⅞	⅞	1	1⅞	1½	1⅞	2⅞	20	⅞	½	¾	1	1⅞	1⅞	1¾	20
25	¾	½	1⅞	1⅞	1⅞	1⅞	1⅞	25	⅞	¾	⅞	¾	⅞	1⅞	1⅞	25
30	⅞	⅞	1⅞	⅞	1	1⅞	1⅞	30	¼	⅞	½	1⅞	¾	⅞	1⅞	30

CLEANING OF BALLAST AND ASHES FROM RAILS

36. Gangers are instructed that all ballast, ashes, &c., must be cleared from around rail chairs and dogspikes, and from along the flanges of the rails, as same not only hides defects, but, in the case of ashes, corrodes the rails and fastenings.

Ballast touching the rails assist leakage of electricity, where level crossing flash lights are installed, thereby causing them to flash and give false warnings, especially under wet weather conditions.

RESPONSIBILITY OF GANGER

37. Gangers will be held responsible for keeping the whole of their lengths clear and safe and all works upon them in good repair.

They must maintain the banks and cuttings in good order, keep all watercourses and catchwater drains clear, examine all loose timber and rocks lying on the steep slopes above the railway, remove all unsafe portions of loose rock or timber without delay, and report immediately to the Inspector such work as may be required but which is beyond the strength of their Gangs to perform.

SECURITY

38. Gangers will be held responsible for the security of all rails, sleepers, and materials on their length, and they must see that all such materials are properly accounted for and that none are wasted.

Gangers are responsible for, and must take care of all tools and implements under their charge.

STOCK ON LINE

39. When stock is found straying on the line, Gangers are to obtain the names of the owners, or failing this, stock are to be impounded, which will permit of the Department procuring the names of the owners, and instituting proceedings against them for trespass.

SLEEPER INSPECTION

40. The inspection and passing of sleepers for payment is one of the most important duties required of a Ganger. Far too many inferior sleepers are accepted from time to time, and this makes extra work for the maintenance man, and consequently higher cost for the Department.

The Ganger when inspecting sleepers must make careful examination and satisfy himself that the sleepers comply to the terms of the contract which are as follows:—

The sleeper shall be seven feet long, nine inches wide and five inches thick (7ft. x 9 ins. x 5 ins.).

The sleepers shall be approved Stringy Bark, Iron Bark, Peppermint, or Blue Gum timber perfectly sound and straight, out of winding and true to dimensions and with square cut ends, free from heartwood, sapwood, shakes, gum veins, large or dead knots or any imperfections likely to affect the strength or life of the sleeper.

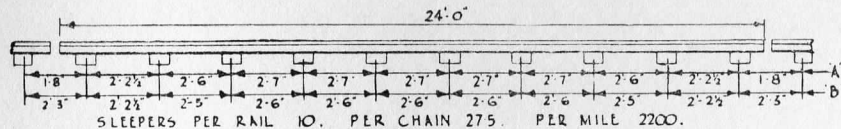
If the sleepers are cut from trees of young growth, they will not be accepted.

SPACING OF SLEEPERS

41. Sleepers in track must be kept square with the rails and correctly spaced in accordance with the following diagram:—

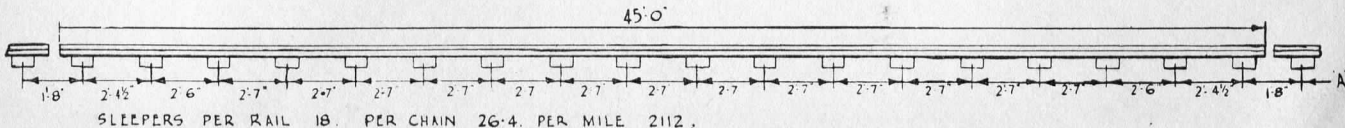
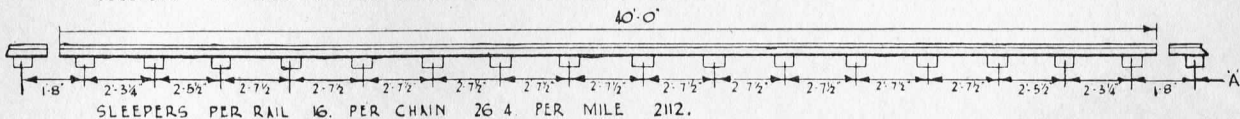
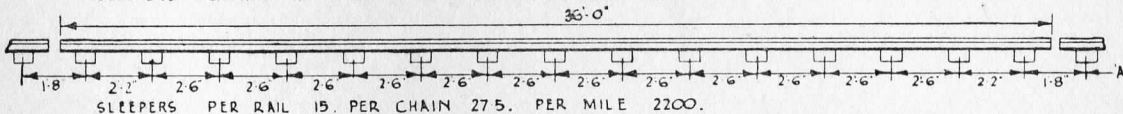
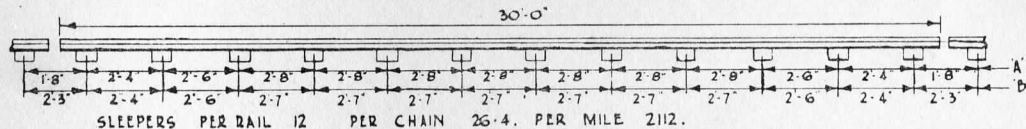
SPACING OF SLEEPERS

Square Joints.



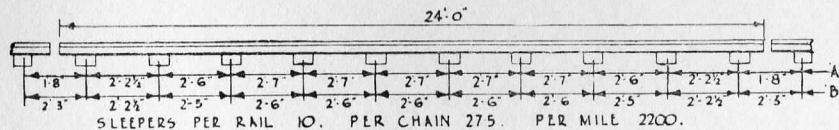
A. Spacing of Sleepers is the Standard to be used for all types of Fishplates except the old 4 hole deep-flanged type of Fishplates.

B. Spacing of Sleepers to be used where the old 4 hole deep-flanged type of Fishplates are in use.



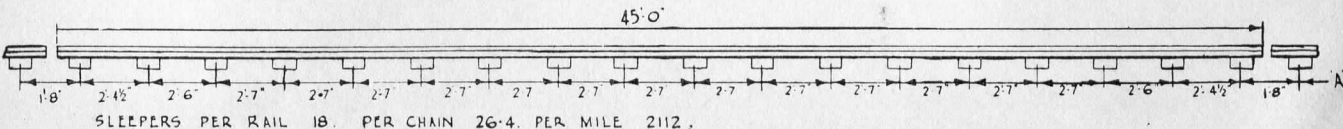
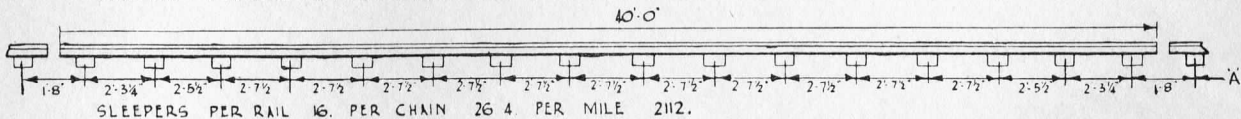
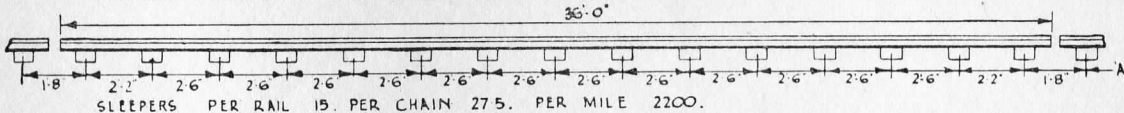
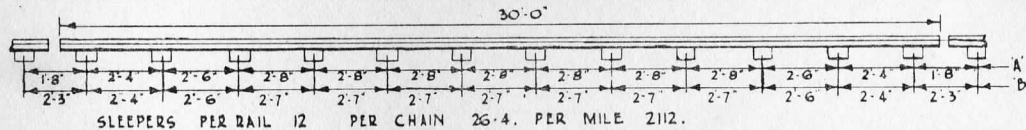
SPACING OF SLEEPERS

Square Joints.



A. Spacing of Sleepers is the Standard to be used for all types of Fishplates except the old 4 hole deep-flanged type of Fishplates.

B. Spacing of Sleepers to be used where the old 4 hole deep-flanged type of Fishplates are in use.



ADZING AND BORING

42. *When base plates are not used.*

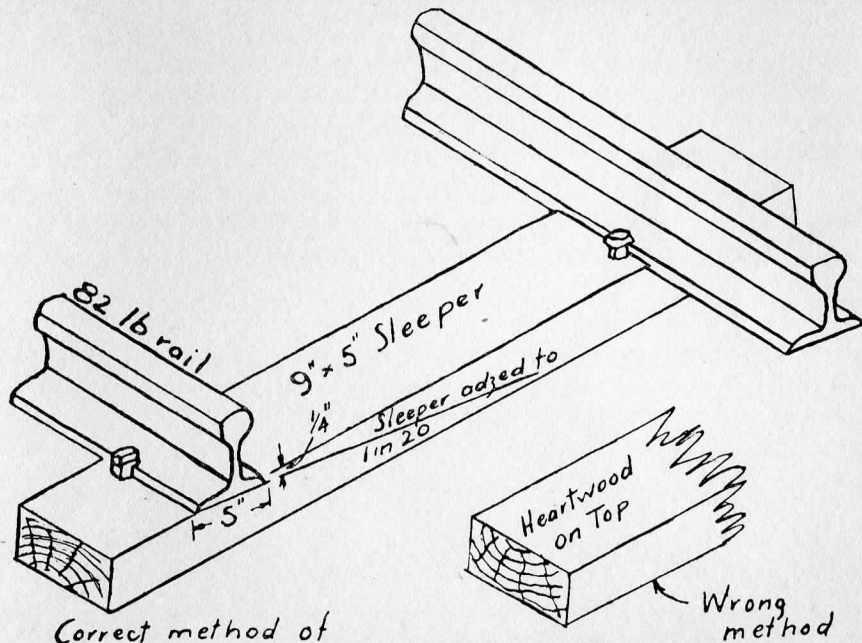
Sleepers must be adzed for the rail seat to a slope of 1 in 20, so as to incline or cant the rails inwards.

The adzing must be the full width of the rail flange, true and even across the sleeper. Adzing must be marked with a

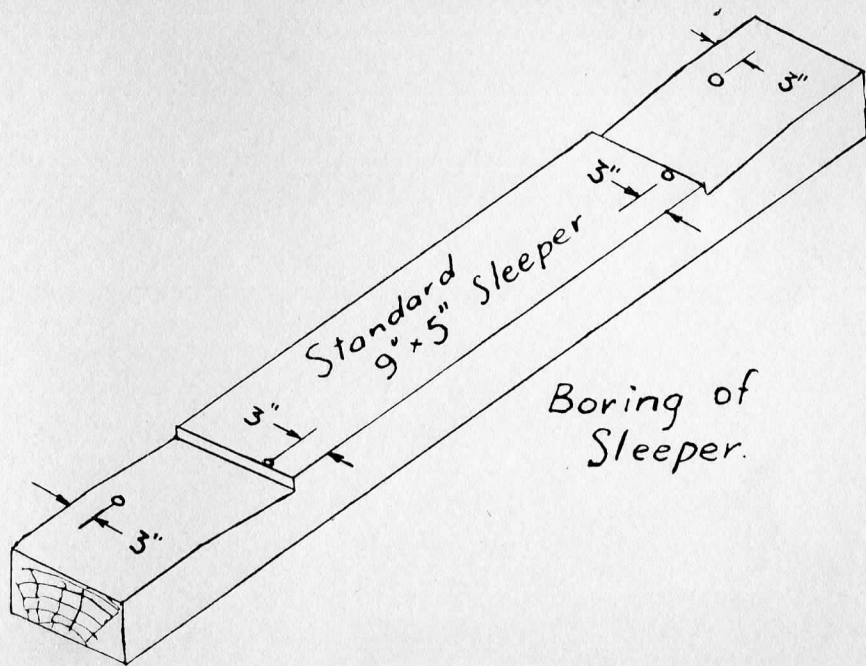
saw cut or sleeper cutter, and tested with a template supplied for the purpose.

On no account will "scooping" of sleepers be permitted.

See attached sketch for correct method of adzing and boring sleepers.



Correct method of
Laying Sleeper Heartwood Down



SLIPS

43. Any signs of slips in cuttings or on embankments should be reported to the Inspector and be carefully watched.

A simple method of noting the movement of a slip is to place a straight row of sticks along the bank, some on the slipping material, and some at each side on the firm ground.

By sighting along these sticks, movement of the slipping material can be easily noted.

Cracks noticed in the tops of slopes should be filled in with clay or heavy loam, but not sand or ashes, and rammed tight, to keep out as much water as possible.

In dry weather any cracks caused by shrinkage, or in a slope should also be stopped up.

SPEEDBOARDS

44. Speed boards for curves must be placed in such a position on the right hand side of an approaching train so that they are readily in sight of the driver and they must be placed a reasonable distance from the tangent point into the straight, to assist the enginedrivers in reducing the train speed to the permissable amount before entering the curve proper.

SPEED RESTRICTIONS

45. The attention of all Members of the Permanent Way Staff concerned is drawn to the procedure to be followed where it is necessary to impose speed restrictions.

The Ganger or other Officer concerned is to immediately advise the Per Way Inspector, District Engineer, and Chief Civil Engineer by telegram in addition to advising Control and the Station Staffs at each end of the section on which the restriction is imposed.

To lift the restriction the Ganger or other Officer concerned is to advise the Per Way Inspector, District Engineer, and Chief Civil Engineer by telegram in addition to advising control and Station Staff at each end of section on which the speed restriction has applied.

Speed Restrictions are divided into three types: They are:—

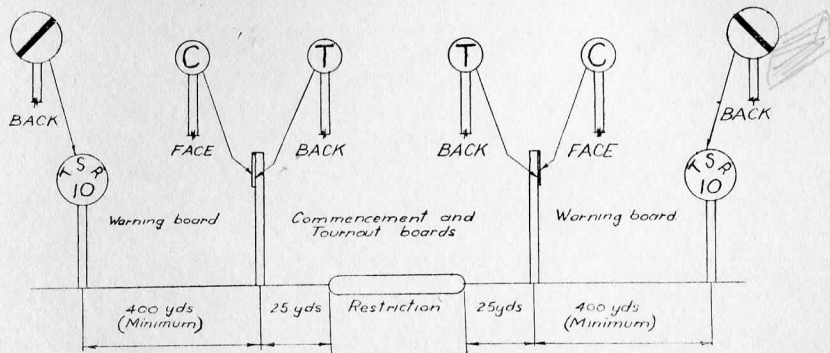
1. Long section and station yard speed restrictions.
2. Short section speed restrictions.
3. Temporary speed restrictions.

Long section speed restrictions are permanent and are or will be imposed on all lines and will be the *maximum allowable speed for each type of train specified*.

Speed Boards *will not* be erected for these restrictions (except special cases) and the restrictions will be published in the Working Timetable and any alterations will be notified in the Weekly Notice.

The following table gives details of these restrictions:—

Round speed boards will be erected as indicated in the following diagram and when not erected because of short duration of the restriction, all concerned must be notified to that effect.



The T.S.R. boards are fitted with reflectors and no lamps will be maintained during the hours of darkness.

Rule 284 to be amended accordingly.

TIDINESS

46. Tidiness is an important factor in the maintenance of a length, the line and line side generally must be kept neat and tidy, particular attention being given to the alignment of the edges of ballast and cess.

This also applies to the stacking of materials, both those for use and scrap.

Old sleepers must not be left in cuttings or deposited in drains. They must be carted and stacked in convenient heaps.

New sleepers, fence posts, fence rails, &c., must be stacked with regularity so that they can be readily counted; they must be stacked at least six inches clear of the ground to assist seasoning and prevent decay.

Stacks should be dispersed as far as possible to avoid danger of fire spreading.

ADVICE TO GANGERS ON TRAIN RUNNING

47. Staff at all officered stations are advised that, in future when it is necessary for a Ganger or his representative to enquire as regards train running, it will be necessary for a reply to be given in writing by use of pen-carbon books which are supplied for this purpose.

The Ganger, or his representative will be supplied with the original; the copy in the book will form part of the station records.

The information supplied to the Permanent Way Staff must be pre-fixed by the date and time such information was passed

on, and the Way and Works employee must affix his signature for the information on both the original and station copy.

When a Ganger obtains information at an unattended station or siding, by telephone from Control, the information is to be entered in the station carbon book, and the words "REPEATED CORRECTLY" together with date, and time, also written after the message, so that a complete record is kept.

The Ganger or his representative receiving the information will enter it in a book which he will keep for this purpose.

CARE OF TARPAULINS

48. Gangers are instructed to see that all tarpaulins not in use at unattended stations, and sidings (where station caretakers are in charge) are folded ready for Guards to lift.

CARE OF TOOLS

49. Gangers are instructed that, as far as practicable, they must see that all tools are locked up in a box, or tool-house when ceasing work each day.

Where tools such as bars, beaters, picks, and shovels cannot be conveniently locked up, they must be placed out of sight and on no account are to be kept lying about the line.

UNAUTHORISED WORK

50. No work may be done which will interfere with the running line, except under the direct control and orders of a Permanent Way Inspector or Ganger.

UNATTENDED STATION BUILDINGS

51. Gangers are instructed that they will be held responsible for keeping unattended station buildings and latrines on their length in a clean and tidy condition.

WATER CASKS AND DRUMS

52. Gangers will be held responsible for seeing that casks or drums are supplied and kept full of water at wooden bridges on their lengths for use in case of fire.

The casks or drums are to be sunk about half-way into the ground except when they are on the escapes.

WATER ON LINE

53. Water is the worst enemy of a track. It is therefore necessary to see that the permanent way drains are kept in good working order.

Grips and drains must be examined at frequent intervals and cleaned out as necessary, particular attention being paid to the outfall.

This is the responsibility of the length Ganger.

Remember, if you cannot keep the water out, you cannot keep the track to the standard required.

Any attempt to turn additional water on to the Railway Property or any interference to the runaway by an outside party, should be reported promptly to the Inspector.

WORKING IN STATION YARDS AND ON ROAD CROSSINGS

54. Gangers must see that portions of station-yards which have been opened out during the daytime for the purpose of repairs, or any other purpose, are filled in, or the ballast levelled off, before they leave work at night, so that shunters or others will not be exposed to unnecessary danger.

In cases where this cannot be done, Gangers must notify the Traffic Member in charge, and, if necessary, place lights on the obstruction.

Where any portion of a road in a station yard or at a level crossing is unsafe, barricades or warning lights or notices must be erected and lights lit at night.

POINTS AND CROSSINGS

Dimensions and Sleepers for 1 in 8 off straight

Type	9" x 5"							Super Feet	Weight-Tons
Old	2/11	7/7	7/8	5/9	6/10	3/11	2/12	1083	2.4
New Standard	2/11	7/7	6/8	5/9	5/10	3/11	3/12	1061	2.35

Type	Length from Points to Intersection	Length of Stock Rail	Curve Radius	Switch Length	Clearance at Heel of Switch	Throw of track of point of Switch
Old	50 feet	18 feet	462 feet	12 feet	2 inches	3½ inches to gauge side of blade
New Standard ..	50 feet	20 feet	462 feet	12 feet	2 inches	4½ inches to gauge side of blade

TEN POINTS WORTH REMEMBERING

56. . . .

1. The Ganger shall see that all safety precautions are taken in accordance with the Rules and Regulations.
2. The Ganger shall keep all drains, cuttings, and culverts clean for the free flow of water.
3. The Ganger shall keep all cesses so that they can assist the ballast to drain the water from the road bed.
4. The Ganger shall have removed all doubtful sleepers so that none remain to cause a derailment.
5. The Ganger shall see that all curves have their standard cant.
6. The Ganger shall see that all fishbolts and bolts in points and crossings are kept tight.
7. The Ganger shall see that point locks cotter and pins are in good order.
8. The Ganger shall see that the gauge of the track is correct at all times.
9. The Ganger shall pay special attention to all clearances so that no damages may come to Departmental property, or injury to himself, his men, or the travelling public.
10. The Ganger shall take the necessary precautions to prevent fires spreading to land owners crops, Departmental Buildings, and materials.

FOOD FOR THOUGHT

57.—*Ganger*:—

Your job is a business, and like all other businesses it needs organisation, so with this thought in mind let us analyse it.

Sleepers—

The average life of the Tasmanian Hardwood sleeper is approximately ten years. There is an average of 2200 sleepers to the mile of track. This equals 22,000 for a ten mile length; so, since the average life of a sleeper is ten years, it will be seen that to maintain the length to the standard required, the annual replacement will need to be approximately 2200 sleepers.

The sleepering programme should be carried out and completed in the *Months*, 1st April to 31st October, in conjunction with the lifting and lining of the track.

The month of November should be devoted to burning off where possible. If only small patches are burnt it will assist to break the continuity of fires at a later date, when the fire hazard is higher.

Fire breaks to be prepared for a distance of two chains at each end of ash dumping areas.

Drums at bridges to be refilled, and replaced where necessary.

Attention to rail expansion at joints paying particular attention to curves.

The Month of December must be devoted to chipping fire breaks for crops and buildings, and all other areas that warrant protection.

The Months of January and February will be known as the general cleaning period, chipping, weeding, and scrubbing with a general nipping and topping programme of the track.

The Month of March must be devoted to the cleaning out of cuttings, and drains, for that all important function, the drainage of the track.

It is not expected that the exact dates can be adhered to for the starting and completing the various programmes of work through the year, however, it is hoped that the suggested programme of work will be a guide and assistance to you in carrying out that most important job of a Maintenance Ganger.

